

THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the subject patent application.

Listing of Claims

Claim 1 (original). A process for prereforming a feedstock, said process comprising:
providing a reactor having a catalyst, wherein the catalyst contains an amount of nickel effective to catalyze the prereforming;
providing the feedstock in the reactor, wherein the feedstock comprises steam, hydrogen, and natural gas containing higher hydrocarbons along with methane;
adding an oxidant to the feedstock, wherein the oxidant provides oxygen in an amount insufficient to partially oxidize all of the higher hydrocarbons to a mixture of carbon monoxide and hydrogen; and
reacting the oxidant with the higher hydrocarbons in the feedstock to provide a gaseous mixture containing methane, carbon monoxide, carbon dioxide, steam and hydrogen, wherein said gaseous mixture is substantially free of higher hydrocarbons and oxygen, to thereby prereform the feedstock.

Claim 2 (original). The process according to claim 1, wherein the oxidant is air or oxygen.

Claim 3 (original). The process according to claim 1, wherein the oxidant provides less than one-half of the oxygen required to partially oxidize all of the higher hydrocarbons to a mixture of carbon monoxide and hydrogen.

Claim 4 (original). The process according to claim 1, wherein the oxidant provides less than one-fourth of the oxygen required to partially oxidize all of the higher hydrocarbons to a mixture of carbon monoxide and hydrogen.

Claim 5 (original). The process according to claim 1, wherein the reactor is a reformer, and the prereforming process is carried out in a top portion of the reformer.

Claim 6 (original). The process according to claim 1, wherein the reactor is a prereformer.

Claim 7 (original). The process according to claim 6, wherein the reactor is an adiabatic reactor.

Claim 8 (original). The process according to claim 7, wherein the reactor is operated at a pressure of 100 to 600 psig, and the feedstock is heated to a temperature of 300 to 600°C before the feedstock is provided to the reactor.

Claim 9 (original). The process according to claim 8, wherein the oxidant provides less than one-half of the oxygen required to partially oxidize all of the higher hydrocarbons to a mixture of carbon monoxide and hydrogen.

Claim 10 (original). The process according to claim 8, wherein the oxidant provides less than one-fourth of the oxygen required to partially oxidize all of the higher hydrocarbons to a mixture of carbon monoxide and hydrogen.

Claim 11 (original). The process according to claim 5, wherein the reactor is operated at a pressure of 100 to 600 psig and the feedstock is heated to a temperature of 400 to 650°C before the feedstock is provided to the reactor.

Claim 12 (original). The process according to claim 11, wherein the oxidant provides less than one-half of the oxygen required to partially oxidize all of the higher hydrocarbons to a mixture of carbon monoxide and hydrogen.

Claim 13 (original). The process according to claim 11, wherein the oxidant provides less than one-fourth of the oxygen required to partially oxidize all of the higher hydrocarbons to a mixture of carbon monoxide and hydrogen.

Claim 14 (original). The process of claim 1, wherein the amount of nickel in the catalyst is at least 1 wt%.

Claim 15 (original). The process of claim 1, wherein the gaseous mixture is reformed.

Claim 16 (original). An apparatus adapted to perform the process of claim 1, said apparatus comprising:

- a reactor;
- a feedstock source comprising steam, hydrogen, and natural gas containing higher hydrocarbons along with methane;
- an oxidant source;
- valves and pipes connecting the feedstock source, the oxidant source and the reactor; and
- a nickel-containing catalyst within the reactor.